

CLAIMS

What is claimed is:

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1. A method of making olefins, comprising contacting an oxygenate feed with at least two different zeolite catalysts to form an olefin composition.

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2. The method of claim 1, wherein the oxygenate feed contains at least 70 wt.% oxygenate.

3. The method of claim 1, wherein the oxygenate feed contains at least 80 wt.% oxygenate.

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4. The method of claim 1, wherein the oxygenate feed contains at least 90 wt.% oxygenate.

5. The method of claim 1, wherein at least one of the zeolite catalysts contains a ZSM-5 molecular sieve.

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6. The method of claim 5, wherein the ZSM-5 molecular sieve is selected from the group consisting an unmodified ZSM-5, a phosphorous modified ZSM-5, a steam modified ZSM-5 having a micropore volume reduced to not less than 50% of that of the unsteamed ZSM-5, and mixtures thereof.

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7. The method of claim 1, wherein at least one of the zeolite catalysts contains a 10-ring zeolite molecular sieve.

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8. The method of claim 1, wherein at least one of the zeolite catalyst contains a zeolite molecular sieve selected from the group consisting of ZSM-22, ZSM-23, ZSM-35, ZSM-48, and mixtures thereof.

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9. The method of claim 1, wherein at least one of the zeolite catalysts contains one of the zeolite molecular sieve selected from the group consisting of ZSM-22, ZSM-35, and mixtures thereof.

5 10. The method of claim 1, wherein at least one of the zeolite catalysts contains a ZSM-35 molecular sieve.

10 11. The method of claim 1, wherein the zeolite catalysts comprise a zeolite catalyst containing a ZSM-5 molecular sieve and a zeolite catalyst containing a ZSM-22 or a ZSM-35 molecular sieve.

12. The method of claim 1 or 11, wherein the oxygenate feed is contacted with the zeolite catalysts mixed together in one reactor.

15 13. The method of claim 1 or 11, wherein the oxygenate feed is contacted with the zeolite catalysts in a first bed containing a first catalyst containing ZSM-5 molecular sieve and a second bed containing a second zeolite catalyst containing molecular sieve selected from the group consisting of ZSM-22, ZSM-35, and mixtures thereof.

20 14. The method of claim 1 or 11, wherein the oxygenate feed is contacted with the zeolite catalysts in separate reactors in series.

25 15. A method of making an olefin composition comprising:
contacting an oxygenate with a first zeolite catalyst to form an olefin product;
separating a butylene containing stream from the olefin product;
and
30 contacting the butylene containing stream with a second zeolite catalyst to form a second olefin product.

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TABLE 1 OF 9

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23. The method of claim 15 or 22, wherein the oxygenate is contacted with the first zeolite in a fluidized-bed or riser reactor.